

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CONSERVATION PRACTICE STANDARD**  
**SALINITY AND SODIC SOIL MANAGEMENT**  
**(Ac.)**

**CODE 610**

**DEFINITION**

Management of land, water and plants to control and minimize accumulations of salts and/or sodium on the soil surface and in the crop rooting zone.

**PURPOSE**

- To reduce and control harmful salt concentrations in the root zone
- To reduce problems of crusting, permeability, or soil structure on sodium affected soils
- To promote desired plant growth and to utilize excess water in the root zone in non-irrigated saline seep areas and their recharge areas.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all land uses where the concentration or toxicity of salt limits the growth of desirable plants or where excess salts cause crusting and permeability problems. This practice also applies to non-irrigated land where a combination of factors such as topography, soils, geology, precipitation, vegetation, land use and cultural/structural practices can increase the extent and concentration of salts in saline seep areas.

**CRITERIA**

**GENERAL CRITERIA APPLICABLE TO ALL PURPOSES**

All work, including associated practices for management of drainage and runoff, shall comply with Federal, State, and local laws

and regulations.

Type and rate of application of soil amendments shall be based on the chemistry of both the soil water and irrigation water (where applicable) regarding concentrations and types of salts and/or sodium, sodium adsorption ratio (SAR or RNa), exchangeable sodium percentage (ESP), concentration and types of salts, and pH.

Improve surface and subsurface drainage as needed to reduce localized ponding and/or high water tables.

**Additional Criteria to Reduce Salt Concentrations in the Root Zone**

On irrigated lands, leaching requirements shall be determined as presented in National Engineering Handbook Part 623, Chapter 2.

On non-irrigated land, reclamation shall utilize vegetative methods, soil amendments, and/or enhanced drainage to effect a reduction in soil salinity.

Refer to Idaho Plant Materials Technical Note No. 9 Plants for Saline to Sodic Soil Conditions for further information.

**Additional Criteria to Reduce Problems of Crusting, Permeability, or Soil Structure on Sodium-affected Soils**

Apply soil amendments containing soluble calcium or that cause calcium in the soil to become available.

**Additional Criteria Specific to Saline Seeps and Their Recharge Areas**

Plant and/or maintain adapted high water use vegetation in recharge areas to utilize soil water.

## CONSIDERATIONS

Soil salinity levels can be monitored to minimize the effects of salinity on crops and to evaluate management practices.

Tools such as electromagnetic induction (EMI) and salinity probes are appropriate for evaluating and for monitoring soil salinity levels.

The drainage water from this practice may have high levels of salts. Select an outlet or disposal area that will minimize the effects of this saline water.

Removal of salts from the root zone by leaching operations may increase contamination of water tables. Avoid excessive leaching and schedule leaching operations during seasons when potential contaminants in the soil profile, such as nitrogen, are low.

For irrigated conditions, an irrigation water management plan should minimize non-point pollution of surface and groundwater resources.

Chiseling and subsoiling can improve permeability, root penetration and aeration where water movement is restricted by layered soils. Avoid inversion tillage that can bring salinity to the surface and interrupt the leaching process.

Green manure crops or applications of organic matter can improve soil structure and permeability.

Polyacrylamides may improve effectiveness of leaching and reclamation of some soils.

Applications of gypsum, sulfur or calcium will help in displacing sodium from the root zone.

Water of slight to moderate salinity not dominated by sodium can enhance leaching of salts.

Residue management can improve the organic matter content of the soil, improve infiltration and minimize surface evaporation and capillary rise of salts to the soil surface.

Consider selecting crops with tolerance to salinity/ sodium levels in the soil.

Consider using bedding and planting methods designed to reduce salinity near plant root zone, especially for germinating seeds.

## PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

Perennial seedings with plants resistant to saline and sodic conditions will be planned using ID-CPA-025 Seeding/Planting Specification.

Seeding rates will be in accordance with those in Idaho Plant Materials Technical Note No. 9 Plants for Saline to Sodic Soil Conditions.

## OPERATION AND MAINTENANCE

No operation and maintenance requirements, national in scope, have been identified for this practice.

## REFERENCES

Ayers, R.S., and D.W. Westcot 1994. FAO Irrigation and Drainage Paper 29 Rev. 1, Water Quality For Agriculture.

ASCE, 1990. Agricultural Salinity Assessment and Management, ASCE Manuals and Reports on Engineering Practice No. 71, New York, NY.

California Fertilizer Association. 1998. Water and plant growth. p. 21–66. *In* Western Fertilizer Handbook. Interstate Publishers, Inc., Danville, Illinois.

Ogle, D., M. Majerus and L. St John. Feb. 2004. Plants for Saline to Sodic Soil Conditions. NRCS. Idaho Plant Materials Technical Note No. 9. 12 p.

Rhoades, J.D., and J. Loveday. 1990. Salinity in Irrigated Agriculture. p. 1089–1142. *In* B.A. Stewart and D.R. Nielsen (ed.), Irrigation of Agricultural Crops. Agron. Monogr. 30. ASA, CSSA and SSSA, Madison, WI.

USDA, Soil Conservation Service. 1993. National Engineering Handbook (NEH), Part 623, Chapter 2, Irrigation Water Requirements. Washington, D.C.

USDA. 1954. Diagnosis and Improvement of Saline and Alkali Soils. Agriculture Handbook No. 60. Washington, DC.